B) homopolymers of monomers having structure (I) or (III) or (IV);

C) copolymers of monomers having structure (I) or (III) or (IV).

REMARKS

Claims 1 and 3-23 are pending. Claims 5, 8-15, 18, 20 and 21 have been withdrawn from consideration. Claims 1, 3, 7, 16, 17, 19, 22 and 23 are rejected. Claims 4 and 6 are objected to. Claim 3 is amended. Support for the amendments can be found throughout the application, for instance in the specification and claims. No new matter is added. Applicants respectfully request reconsideration and withdrawal of all rejections and/or objections.

Claim Rejections - 35 U.S.C. 112

Claims 3 and 7 are rejected under 35 U.S.C. 112, first paragraph, as being indefinite. Applicants respectfully urge that the rejection is moot in view of the claim amendments indicated herein. Applicants urge withdrawal of the rejection.

Applicants also note that is it stated in the Office Action that claims 5, 18 and 21 have been withdrawn from consideration, in view of the election of group I, claims 1-7, and species including a monomer of formula (II) where $Y_1 = Y_2 = F$, and the comonomer of the formula (I) where $X_1 = X_2 = F$ and $Z = OCF_3$. However, Applicants respectfully wish to point out that claim 5 refers to the monomer of formula (I) (i.e., one of the elected species), and thus withdrawal of the claim from consideration appears to be

incorrect. Applicants note that the same can be said for claim 18, since Z = OR_f is a substituent of the fluorinated dioxole monomer of formula (I) (See page 22, line 1 of the original specification). Similarly, claim 21, which is dependent on claim 5, recites a selected range of the fluorinated dioxole monomer of formula (I). Applicants therefore respectfully urge reconsideration and examination on the merits of these claims.

Allowable Subject Matter

It is stated in the Office Action that claims 4 and 6 would be allowable if rewritten to overcome the rejections of 35 U.S.C. 112, second paragraph. It is further noted that the membrane of claim 4 is not found in the prior art of record. However, Applicants wish to point out that the invention of claim 4 is not only concerned with a membrane having a particular composition, but more important a membrane made of (per)fluorinated amorphous polymers, wherein the membrane has pore size in the range 5 -500 nm, wherein the pore size distribution is such that 80% - 90% of the pores have a size ranging from minus 5 nm to plus 5 nm of the value of the distribution maximum peak. Applicants continue to urge that no membrane with such features as claimed is taught or suggested in the prior art, as further discussed below.

Claim Rejections - 35 USC §103

Claims 1, 3, 5, 7, 16, 17, 19, 22 and 23 are rejected under 35 USC §103 as being obvious over Banerjee (U.S. Patent No. 5,795,668).

Applicants respectfully disagree. Applicants note that it appears to have been alleged in the Office Action that claim 3 is concerned with membranes made of polymers of monomers having structures I - IV, and such features are disclosed by Banerjee. It also appears to have been alleged that the Banerjee reference discloses a membrane support having a pore size 0.05 to 10 micrometers and a porosity of about 50 - 95%. While the Banerjee reference fails to disclose pore size with respect to the value of the distribution maximum peak, a pore size between 5 and 500 nm as in the claimed invention is considered to overlap with the pore size disclosed by the reference.

Although the Office Action at page 4, lines 1-9 is somewhat difficult to understand, it seems to have been further alleged that since the range defined by the maximum peak value of ± 5 nm may overlap the lower range of pore size in Banerjee, it is considered evident that a membrane with the same pore size range and porosity percentage as the claimed invention is obtained by Banerjee.

However, Applicants respectfully point out that a proper rejection of obviousness must be based on the knowledge generally available to those of ordinary skill in the art. Applicants therefore respectfully point out that nowhere in Banerjee is there any teaching or suggestion of an amorphous membrane having a pore size distribution as required by the claimed invention (See claim 1). It is to be noted that such a pore size distribution, as shown by the permeability and gas selectivity values for the membranes of Examples 1-4 (average pore size from 34 nm to 59 nm) (See Table 1 at page 20 of the specification), allows for high permeability and no selectivity to gases. Indeed, such a claim characteristic enables the use of membranes of the claimed invention, for instance, in separation processes wherein gases should be removed from liquids (See

page 14, lines 3-12 of the specification). Again, there is simply no teaching or suggestion in Banerjee directing those of ordinary skill in the art to any membrane according to the claimed invention.

In fact, although certain claims are concerned with a membrane or product, Applicants urge that it is important to note that the manufacturing processes for the support layers of Banerjee (col. 7, lines 37-53), are entirely different from the manufacturing processes for the membranes of the claimed invention (See pages 6-8 of the Response filed on August 19, 2002). Indeed, Example 5 (comparative) shows that by modifying the manufacturing process of the present invention (i.e., preparing a solution of polymer in a fluorinated solvent, and then obtaining the membrane by coagulating instead of evaporating the polymer solution), there is obtained a membrane with very low permeability and selectivity to gases (See Table 2 at page 20 of the specification). Applicants therefore emphasize that the physical characteristics of the membranes of the claimed invention can be related to the manufacturing process. Since this process is different from the processes disclosed in Banerjee, Banerjee is simply unable to teach or suggest or obtain any membrane according to the claimed invention. Indeed, in this art, physical characteristics are not necessarily related to the chemical composition of the polymer membranes; rather the manufacturing process plays an important role.

With respect to the issue of membranes of the claimed invention and Banerjee having the same percentage of porosity as defined by Banerjee (porosity being defined in the reference as the ratio of the volume occupied by the pores to the entire volume of the porous material) (col. 7, lines 12-14), Applicants note that the "porosity" in the

claimed invention is defined differently, referring instead to the pore size distribution. Even taking this into account, however, those of ordinary skill in the art would recognize that a membrane having a coarse distribution of large pores can have the same "porosity" (as above defined by Banerjee), as a membrane having a fine regular pattern of small pores. Thus, knowledge of porosity would not provide those of ordinary skill in the art with any teaching or suggestion so as to arrive at any membrane according to the claimed invention. In this case, it is pore size distribution that represents a critical parameter of the claimed invention (See claim 1).

Applicants point to the membrane of the present invention according to Example 3 (See page 17 of the specification), having a pore size distribution of 40 to 100 nm, wherein about 90% of the pores have a size in the range 55-64 nm. In other words, the membrane includes pore sizes in the range of 0.05-10 microns as disclosed by Banerjee (col. 2, line 67). It is pointed out, however, that the membrane of Example 3 is shown to have high permeability and no selectivity to gases. In fact, from Table 2 it can be seen that the permeability to oxygen, nitrogen and carbon dioxide is very high and the same for each gas (25,000 barrer).

In contrast, however, according to Banerjee the preferred support layer is identified as TEFLON® AF (col. 6, line 46). Although Applicants have previously discussed the Resnick reference, and the reference is not cited in this Office Action, Applicants wish to add the following. In Figure 22.17 of Resnick, there are shown permeability figures of TEFLON® AF for oxygen, nitrogen and carbon dioxide. Also, in the Table 1 attached hereto, there are reported corresponding figures and permeability values, for the membrane of Example 3 according to the claimed invention, noted above

to have some pore sizes in the range disclosed by Banerjee, and various TEFLON® AF membranes. These show much different selectivities for oxygen, nitrogen and carbon dioxide.

Applicants therefore point out that from this attached Table 1, it may be concluded that porous supports according to Banerjee are quite different from the membranes of Example 3 according to the claimed invention. It is to be noted that even though membranes may have pore sizes within a range disclosed by Banerjee, when compared to the membranes of the claimed invention, the porous supports of Banerjee also have: 1) much lower permeability, and 2) different selectivity for oxygen, nitrogen and carbon dioxide. With respect to the permeability, Applicants note that the highest permeability value for the membrane TEFLON® AF (See Resnick) is the value concerning carbon dioxide for TEFLON® AF-2400 solution cast (3,900 Barrer), that value being about 84% lower than the corresponding value for carbon dioxide (25,000 Barrer) for the membrane according to Example 3. Applicants therefore urge that not only do the membranes of Banerjee have much lower permeability as compared to the membranes of the claimed invention, but that such membranes are not suitable for the same purposes as the claimed invention. Applicants therefore again urge withdrawal of all claim rejections.

Applicants also note that in view of the above comments, any objections and/or rejections with respect to the dependent claims 5 and 7 should also be withdrawn. The same holds true for the dependent claims 17, 19 and 22. Applicants further point out that claims 16 and 23 may be considered not taught or suggested in the prior art, since

the separation processes achieved with membranes according to the claimed invention are also not taught or suggested in the prior art including the Banerjee reference.

Therefore, in view of the amendments and remarks above, Applicants submit that this application is in condition for allowance and request favorable action thereon.

In the event this paper is not timely filed, applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300, along with any other additional fees which may be required with respect to this paper referencing Attorney Docket No. 108910-00006.

Respectfully submitted,
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Enclosure: Marked-Up Copy of the Claim Amendments
Table 1

Marked-Up Copy of the Claim Amendments

Claim 3 (Amended). Porous membranes of (per)fluorinated amorphous polymers according to claim 1, the (per)fluorinated polymers selected from the group consisting of A), B) and C):

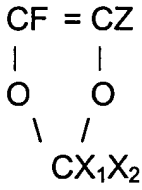
A) polymers made of monomers that are selected from the [following] group consisting of formulas (I), (II), (III) and (V):

$$CF_2=CY_1CY_2 \qquad (II)$$

wherein: Y_1 and Y_2 are selected from F, Cl, CF_3, OR_f

wherein R_f is a C_1 - C_5 perfluoroalkyl radical;

dioxoles having structure (I):



(I)

wherein: Z is selected from F, R_f, OR_f; R_f is a perfluoroalkyl radical C_1 - C_5; X_1 and X_2 are selected from F and CF_3;

bisvinyloxymethanes having structure (III):

$$CFX^1=CX^2\text{-}O\text{-}CX^3X^4\text{-}O\text{-}CX^2=CX^1F \qquad (III)$$

wherein X^1 and X^2, equal to or different from each other, are F, Cl; X^3 and X^4, equal to or different from each other, are F or CF_3;

dienes having structure (IV);

$$CF_2=CF-O-(CF_2)_n-CF=CF_2 \qquad (IV)$$

wherein n = 1 - 5;

B) homopolymers of monomers having structure (I) or (III) or (IV);

C) copolymers of monomers having structure (I) or (III) or (IV).

Table 1

en, nitrogen and carbono dioxide of the membrane . 3, page 17 of the spec and of Teflon AF membranes rjee). Figures for the membrane of ex. 3 are taken from e Spec. Figures for Teflon AF membranes are taken from snick. In this case centiBarrer were converted into Barrer (1 Barrer = 0,01 centiBarrer)			
	Permeability values		
the e 17) the nm	Teflon® AF-1600	Teflon® AF-2400 melt -processed	Teflon® AF-2400 solution cast
	340	990	1,600
	-	490	780
	-	2,800	3900